

NOTES.

PROF. GRAHAM KERR has just received a letter from Mr. J. S. Budgett in which the latter announces that he has solved the important problem of the development of *Polypterus*. The letter is written from southern Nigeria and dated August 28. It appears that Mr. Budgett has been able to fertilise a large quantity of eggs of *Polypterus senegalus*, and that the early development is "astoundingly frog-like"—segmentation being complete and fairly equal, and the process of invagination resembling that of the frog's egg. Prominent neural folds are formed which arch over in the normal fashion. Mr. Budgett had already made three expeditions to various parts of tropical Africa in his endeavour to obtain material for studying the development of *Polypterus*, and zoologists will rejoice that his efforts have been at last attended with success. The Crossopterygians have been for some time the most important vertebrate group awaiting the investigation of the embryologist, and the results gained by Mr. Budgett in the working out of his material in the laboratory will be looked forward to with the greatest interest by all vertebrate morphologists.

A MOVEMENT is in progress for erecting a memorial of James Watt, and at a meeting recently held it was decided that the form the memorial should take should be an institution for scientific research, and an appeal is now being made for funds to carry out the project. Mr. Andrew Carnegie, who is the secretary for America, has promised a subscription of 10,000*l.* towards the object.

THE Bombay University Syndicate announces that the subject selected for the Dr. Theodore Cooke memorial prize for 1905 is "Electric Traction and the Application of Electricity to the Requirements of Cities in India." Competitors for the prize should be graduates in engineering of the University of Bombay of not more than seven years' standing.

THE second International Congress of Philosophy is to be held in September of next year in Geneva.

THE fourth International Congress of Psychology will, it is stated, meet in Rome in the spring of 1905, instead of in the autumn of 1904, as had been arranged.

DR. LOUIS PARKES has been appointed to succeed the late Prof. Corfield as consulting sanitary adviser to H.M. Office of Works.

THE forty-eighth annual exhibition of the Royal Photographic Society opens to-day at the New Gallery, Regent Street. The exhibition will remain open until October 31.

FURTHER trials on the electric railway at Zossen have resulted in a speed of nearly 114 miles an hour being attained.

AN exhibition of the pathological specimens which have been added to the St. George's Hospital Museum during the past year will take place at the museum from October 1 to 17.

THE death is announced of Mr. Washington Teasdale, of Leeds, at the age of seventy-three. He was a fellow of several scientific societies, and president of the Leeds Astronomical Society.

A REUTER telegram from Santiago de Cuba announces that a shock of earthquake, the most violent since 1885, occurred there on the morning of September 19, and lasted fifteen seconds.

THE death, at the advanced age of eighty-five, is announced of Dr. Alexander Bain, who for twenty years occupied the chair of logic in the University of Aberdeen, and was a voluminous writer on language, logic, psychology, and kindred subjects.

IT is stated by Reuter that the private subscriptions towards Captain Bernier's projected North Pole expedition amount to 12,000*l.*, of which Lord Strathcona has given 1000*l.* It is also stated that the Canadian Government will probably build and equip the vessel for the expedition.

A PROVINCIAL sessional meeting of the Sanitary Institute will be held at the University of Birmingham on Saturday next, September 26. A discussion on some practical considerations in connection with modern methods of treating sewage will be opened by Prof. A. Bostock Hill and Mr. J. E. Willcox.

THE Colonial Economic Committee of Berlin announces that the utility of the gutta-percha discovered by the expedition which was undertaken to New Guinea under the leadership of Herr Schlechter has so far been established that the gutta-percha from the low-lying country may be regarded as suitable for cable purposes as an admixture, and, if carefully obtained, be fit for cables in a pure condition. Large quantities of gutta-percha have been obtained from New Guinea, and are at present being tested, the Secretary of State for the Imperial Post Office having granted a large sum of money for the purpose. It is proposed by the Colonial Economic Committee to establish a gutta-percha enterprise for the education of the native population of New Guinea in the cultivation of gutta-percha and its winning. This will take the form of a fresh expedition under Herr Schlechter for a period of three years. Assistance will be given by natives of Borneo and others familiar with the question of rubber production.

A SUCCESSFUL journey through eastern Mongolia (supplementing a more extended journey accomplished last year by Mr. Campbell, Chinese Secretary of the British Legation) has, says a Peking correspondent of the *Times*, just been completed by Mr. Claude Russell and Mr. Hicks Beach. The party left Peking on July 20, and, passing through Jehol, struck north to the Manchurian Railway at Tsitsihar, which was reached in forty-eight days. Their route lay east of the Khingan Mountains, the distance covered, 1000 miles, being to a considerable extent, so far as is known, through country not previously visited by any European. The travellers rode on ponies, with pack mules for their baggage. They had four servants, but no escort. They met with unfailing courtesy from all classes, both Mongols and Chinese. The country is thinly peopled, but is being gradually colonised by Chinese from within the Great Wall.

A BRITISH and International Aëronautical Exhibition, organised by the Aëronautical Institute, was opened at the Alexandra Palace on Thursday last. Among the exhibits are a model balloon, and kites and specimens of balloon accessories sent by the German Government, examples of Mr. S. F. Cody's kites and his gear for flying them, various flying machines either full size or in model form, and the large machine which Dr. Barton is constructing. In connection with the exhibition three competitions are to be held, silver and bronze medals being awarded to the two winners in each. The first is for kites, and in judging consideration will be taken of the way in which the kite leaves the ground, the manner in which it ascends, its steadiness, the time required to let out the whole mile of wire or string, the altitude attained, and the

rapidity and manner of descent. The second competition is also for kites, and is organised with a view of ascertaining the best and safest form of *aéroplane* for man-lifting kites and dynamic flying machines. The third competition is for parachutes.

IN the *Atti della Fondazione Scientifica Cagnola* (vol. xviii.), Prof. Grassi gives an excellent survey of our present knowledge of malaria. He describes fully its epidemiology and prophylaxis, and the morphology and development of the malaria parasite. In the latter connection he introduces some new terms. The asexual parasites producing the febrile attacks are named "monogonia," the developmental forms in the mosquito "amphigonia," while the recurrent attacks of fever which occur at long intervals after infection are regarded as being due to parthenogenetic parasites, which develop from the non-flagellating (female) sexual cells, or gametocytes.

THE first volume of reports of the Sleeping Sickness Commission of the Royal Society has just been issued. In report No. 1 Dr. Aldo Castellani describes his discovery of the presence of a trypanosoma in this disease (see NATURE, lxxviii., p. 116). Report No. 2 is a "progress report" by Lieut.-Colonel Bruce, F.R.S., and Dr. Nabarro, who have continued the work of Dr. Castellani, and they confirm his discovery of the presence of a trypanosoma in the cerebro-spinal fluid of sleeping-sickness. In every one of forty cases examined the trypanosome was found, even in the early stages. In fifteen cases of other diseases the trypanosome was not observed, so that the parasite is not present in the cerebro-spinal fluid of the general population. In the blood also of sleeping-sickness the trypanosome is practically always to be met with. In six individuals suffering from fever, but presenting no symptoms of sleeping-sickness, trypanosomes were also detected in the blood but not in the cerebro-spinal fluid. The question arises whether the trypanosome found in the blood of these six cases was the same species as that present in sleeping-sickness. Morphologically there are certain differences between the two, but the results of inoculation experiments are up to the present indefinite. The distribution of sleeping-sickness in Uganda is striking, the disease occurring only in a belt of country fifteen miles wide on the northern shores of the Victoria Nyanza. In this district a tsetse fly (identified as *Glossina palpalis* by Mr. Austen, of the British Museum) was observed to be very abundant, and the question is raised whether this fly conveys the infection in sleeping-sickness, just as one does in the tsetse disease of horses, &c., which is also due to a species of trypanosoma. Flies, freshly caught, were allowed to bite a monkey, and in five days trypanosomes were found in its blood, showing that the flies do convey trypanosome infection, though whether the sleeping-sickness species it is not yet possible to say. The report concludes with the clinical histories of a number of cases of the disease, and is illustrated with ten plates.

WE have recently received meteorological "Yearbooks" (1) from Dr. H. Hergesell, director of the service of Alsace-Lorraine, containing hourly observations for Strassburg and summaries at various other stations, for the year 1899; and (2) from Dr. P. Berghaus, containing hourly observations for Bremen, and rainfall statistics at a few stations. The observations and results of both "Yearbooks" are carefully prepared according to the uniform system adopted for all the States of the German Empire.

DR. G. HELLMANN has published a rain chart of the Prussian provinces of Hessen-Nassau and Rheinland, in-

cluding Hohenzollern and Oberhessen, together with a discussion of the rainfall statistics for the last ten years. This work is the eighth of the valuable series prepared by him at the request of the Berlin Meteorological Department, to which we have before referred in our columns. The tables contain mean annual values of rainfall, monthly percentages of those values, the greatest falls in short periods, and other useful information.

IN a paper read before the Royal Society of New South Wales, Mr. H. C. Russell clearly disproves a somewhat common belief that a wet season in England is followed by a wet season in Australia. A diagram illustrating the paper shows that, although sometimes heavy rains in England will be followed next year by heavy rains in Australia, they seldom do so. Mr. Russell finds that, from 1880 to 1885, and from 1894 to 1901, for instance, rain was abundant in England, while Australia was suffering a severe drought.

A PAPER read before the South Staffordshire and East Worcestershire Institute of Mining Engineers by Mr. F. G. Meachem deals with underground temperatures. The mean increase in temperature, deduced from the summary of the results collected by the British Association committee and published in 1882, was 1° F. for a descent of 64 feet. Since 1882 other important observations have been made, from which it appears that the highest rock-temperature obtained at a depth of 4580 feet (Calumet and Hecla Copper-mines, Lake Superior) is 79° F., the temperature at a depth of 105 feet being 59° F. The difference of temperature in the column of 4475 feet of rock was 20° F., averaging 1° F. for every 224 feet. The average annual temperature of the air where the observations were made is 48° F., and that of the air at the bottom of the shaft is 72° F. The mean increase obtained by the observations of Mr. H. A. Wheeler at other mines in the Lake Superior district in 1886 was, however, 1° F. in 100.8 feet. Mr. Meachem has made various temperature-tests at Hamstead Colliery extending over several years, and all observations show an increase of temperature in undisturbed strata of 1° F. for every 110 feet of descent beyond 65 feet from the surface. It has been found that the temperature of the undisturbed strata at the pit bottom, 1950 feet below the surface, is 66° F. This was ascertained by inserting a maximum and minimum thermometer, protected by a metal case, into a bore-hole driven 10 feet into freshly-cut coal. The hole was closed with clay and left for various periods from one to fourteen days. Repeated observations led to the result stated. It is concluded that by sinking larger shafts and introducing more efficient ventilating machinery, miners will be able to do as much work at a depth of 3000 feet as is now done at a depth of 1000 feet, and that mining engineers will be able to reach any depth at which coal is likely to be found in this country and work the same.

WE have received the second fasciculus (with plates 13-24) of Dr. E. A. Goeldi's "Album of the Birds of Amazonia" (*Album de Aves Amazonicas*), in course of publication by the Museum Goeldi, at Para. The plates of this part, which, like their predecessors, are coloured, include selected representatives of the Cotingidæ, Psittacidæ, Cerebidæ, Picidæ, Formicariidæ, Cuculidæ, Dendrocolaptidæ, Cracidæ, &c., and likewise depict those extremely characteristic South American birds, the trumpeter, seriema, horned screamer, ruddy tinamu, and rhea. The latter bird, it may be mentioned, is commonly known by Europeans in Brazil as the emeu (ema), while it may also be noticed that the native name anhuama might conveniently be adopted in ornithological literature for the screamers. The plates

depict, so far as possible, the birds in their natural surroundings, and although in some perhaps a trifle too gaudy, the colouring appears to be very true to nature. When complete, the book should be invaluable to all interested in the birds of Brazil.

ANOTHER illustrated work recently to hand (although the cover is dated 1902) is part x. of the atlas of the section devoted to Crustacea in "Illustrations of the Zoology of the Investigator," by Major Alcock and the late Mr. A. F. McArdle. This part includes plates lvi.-lxvii., the majority of which illustrate crabs, although some crawfishes are also figured. In the absence of the text, fuller notice is difficult.

THE Boston (U.S.A.) Society of Natural History is to be congratulated on the decision to publish an annual summary of the work done on the land mammals of North America. The part just issued, dealing with the years 1901 and 1902, forms No. 3 of the Society's *Proceedings*, and is compiled by Messrs. Miller and Rehn. With the aid of such annual summaries naturalists in other countries may hope to keep abreast of American work in this department of zoology.

WE have received the second part of vol. xiv. of the *Natural History Transactions of Northumberland, Durham, and Newcastle*. It contains the presidential addresses for the years 1901 and 1902, both of which set an excellent example in that they deal exclusively with local subjects. The committee records with regret the determination of the Tyneside Naturalists' Field Club to terminate its connection with the Society, which has existed since the year 1864; this feeling of regret will, we think, be widespread, especially as it will involve in the near future a severance of the *Joint Transactions* of the two bodies.

ARTICLE two of vol. xvii. of the *Journal* of the College of Science of Tokyo contains an account of a worm (*Ceratocephale osawai*) which, at certain seasons, appears in swarms in the Gulf of Tokyo and the rivers debouching therein, after the manner of the palolo worms of the South Pacific and the Atlantic. Instead, however, of belonging to the Eunicidæ, the Japanese species, which is regarded by its describer, Mr. A. Isuka, as new to science, is referable to the Lycoridæ. According to the experience of the fishermen, which is confirmed by Mr. Isuka's personal observations, the Japanese "palolo" swarms during the months of October and November, usually in four periods of a few days' duration each. The swarming season always takes place when the moon is either new or near the full, and invariably occurs in the evening just after flood-tide. On the occasion of the author's observation, the height of the swarm did not last more than a couple of hours, the worms after this apparently sinking to the bottom exhausted.

THE collections of plants made by Mr. J. N. Rose in Mexico and Central America have not only added a number of new types, but have yielded several plants which are likely to be of horticultural value. In an account, the third which has appeared in the *Contributions* from the United States National Herbarium, attention is directed to two new bulbous species of *Polianthes*, and a *Crinum*. Of the genus *Argemone* the author has obtained eleven species, including the three well-known cultivated species of which wild specimens are rare, even in herbaria.

THERE is very considerable difficulty in obtaining information concerning the botany of Siam, and the reason for

this appears to be that no collectors have attempted to work the country systematically. Mr. F. N. Williams has written a short article on this subject in the current number of the *Journal of Botany*, in which he enumerates the few collections of Siamese plants which he has discovered in the Kew Herbarium. Almost as little known is the algal vegetation of the Shetland Isles, for which the only records date back to the year 1845. A list of the marine algæ collected by Mr. Borgeesen—together with those previously recorded—is contributed by him to the same journal.

THE growth of canker-areas on trees has been attributed by some investigators to frost, and by others, including Hartig, to the ravages of the fungus *Nectria ditissima*. The suggestion made some years ago that bacteria were the cause of disease has not met with much support from pathologists. In the *Bulletin International de l'Académie des Sciences de Cracovie*, Mr. J. Brzeziński adduces fresh evidence in favour of this view so far as apple, pear, and hazel trees are concerned. After unsuccessful attempts to set up disease in sound tissues by infection with *Nectria*, the author sought for the origin of disease in the bacteria which are abundant in the wood elements. It was not difficult to get pure cultures, and after inoculation with the bacteria discoloration and destruction of the tissues soon followed. Canker spots were not produced, but it is probable that they would not develop in the space of time during which the experiments were conducted.

A REPORT has recently been issued by the Foreign Office giving the result of inquiries made by His Majesty's ministers as to the navigable inland water-ways in France, Belgium, the Netherlands, Germany, and Austria-Hungary. The reports are necessarily statistical, but at the same time contain a great deal of useful information. Each of the above countries has expended out of State funds during the past twenty-five years very large sums in improving the inland navigation either by deepening and improving the natural rivers, or, where this was not practicable, by canalising them, or by the construction of new water-ways. Mr. Hugh O'Beirne, who drew up the report relating to France, has arrived at the conclusion that, taking into consideration the cost of improving the water-ways, which varies from 14,924*l.* to 64,516*l.* per mile, it would have been cheaper and more advantageous to have constructed railways. Mr. Robinson, the reporter for the Netherlands, directs attention to the use of petrol motors for moving the boats, and says that the number of small steamers and tugs employed on the water-ways has immensely increased in Holland, and that water transport seems to be on the verge of a revolution owing to the introduction of the cheap, small and practical petroleum motors which can be fitted to almost every description of craft.

A NEW edition—the third—of "The Figures, Facts and Formulæ of Photography" has just been published by Messrs. Dawbarn and Ward, Ltd. The work has been considerably enlarged, and now has an index.

WE have received a copy of the map and report on the auriferous quartz reefs of Cue and Day Dawn in the Murchison Goldfield of Western Australia, by Mr. W. D. Campbell (*Bulletin* No. 7 of the Geol. Survey, W.A.). The reefs lie in areas of granite, diorite and amphibolite.

THE ninth edition of the well-known "Bloxam's Chemistry," revised and rewritten by Prof. J. M. Thomson, F.R.S., and Mr. A. G. Bloxam, has been published by Messrs. J. and A. Churchill. The work retains its characteristics

as a convenient, though necessarily condensed, account of essential points in inorganic and organic chemistry, and it will doubtless remain a popular volume of ready reference for students.

MESSRS. C. GRIFFIN AND CO. have published a second edition of the late Dr. Alder Wright's work on "Animal and Vegetable Fixed Oils, Fats, Butters, and Waxes," edited and partly rewritten by Mr. C. A. Mitchell. The scope of the work has been extended in the direction of the requirements of practical chemists, more details being given of analytical methods and processes for detecting adulteration of individual oils. The systematic description of tests for adulteration occupies 222 pages, and consists almost entirely of new matter.

THE additions to the Zoological Society's Gardens during the past week include a Vervet Monkey (*Cercopithecus lalandii*) from South Africa, presented by Mr. A. F. Putz; a Lesser White-nosed Monkey (*Cercopithecus petaurista*) from West Africa, presented by Dr. S. Carew; a Sooty Mangabey (*Cercocebus fuliginosus*) from West Africa, presented by Mr. Frank Ree; a Gt. Indian Ground Squirrel (*Xerus getulus*) from Morocco, presented by Mr. D. Seth Smith; two Green Lizards (*Lacerta viridis*), European, presented by Mr. R. E. McLaren; a Chimpanzee (*Anthropopithecus troglodytes*, ♂) from West Africa, two Suricates (*Suricata tetradactyla*) from South Africa, an Indian Coucal (*Centropus rufipennis*) from India, deposited.

OUR ASTRONOMICAL COLUMN.

THE ROTATION PERIOD OF SATURN.—In No. 3900 of the *Astronomische Nachrichten*, Mr. W. F. Denning gives a résumé of his observations of the white spots which have been visible on Saturn since July 1; out of thirty-two observing nights only seven were recorded as giving "good seeing." Mr. Denning finds it difficult to reconcile the rotation period observed with that usually given, i.e. 10h. 15m., but finds that a period of 10h. 39½m. agrees with the observations much better. As the mean of many observations of seven of the markings, he obtains the period 10h. 39m. 21.1s., so that if the bright spot discovered by Prof. Hall in December, 1876, near to the equator of Saturn, really represented, in its period of 10h. 14m. 23.8s., the rotation of that part of the planet, there is a difference of 25 minutes between the equatorial and the north temperate currents, the latter being the slower; this is in accordance with the Jovian phenomena, where the north temperate markings take 5½ minutes longer for one rotation than do the equatorial markings.

A collection of the observations, made by various observers, of Barnard's large white spot indicates a rotation period of 10h. 38m. for that region of the planet.

NEWLY DETERMINED STELLAR RADIAL VELOCITIES.—From spectrograms obtained at Potsdam with the spectrograph No. iv., in conjunction with the 32.5cm. refractor, Prof. Vogel has determined the radial velocities of β Arietis, ω Ursæ Majoris, and ϵ Ursæ Majoris. From measurements of the magnesium line at λ 4481, he has found the relative velocity in the line of sight of the components of β Arietis to be between 60 and 70km., of ω Ursæ Majoris about 45km., and of ϵ Ursæ Majoris about 15–20km. (*Astronomische Nachrichten*, No. 3898).

REPORT OF THE CAPE OBSERVATORY.—In his report of the Cape Observatory for the year 1902, H.M. Astronomer, Sir David Gill, refers to several additions and improvements of the instrumental equipment.

The new 24-inch Zeiss objective prism, presented to the observatory by Dr. Frank McClean, F.R.S., is now ready for mounting, and has a refracting angle of $11\frac{1}{3}^\circ$.

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The oppositions of Uranus, Saturn, Jupiter, and Neptune were observed with the heliometer, and 476 observations of α Centauri were made in connection with a redetermination of the parallax of that star undertaken by Messrs. Cookson and Lowinger.

Two hundred and eighty successful spectra of stars ranging in magnitude from 3.5 to 5.5 were obtained with the 24-inch "Victoria" telescope fitted with the "Grubb" objective prism.

In connection with the astrographic chart work 522 triple charts have now been taken, and 434 plates, containing 248,921 stars, have been completely measured up to date.

The geodetic survey of South Africa is being carried out despite climatic difficulties, but the determination of the Anglo-German boundary in south-west Africa has been delayed by the imperative necessity for giving the workers a rest and a change of climate; the whole of the triangulation is, however, complete.

LIVERPOOL ASTRONOMICAL SOCIETY.—The first annual report of this society shows that a successful session has been held. The Society possesses a fine 5-inch equatorial by Cooke and Sons, of York, a 3-inch transit instrument, a sidereal clock, and a valuable library.

Amongst the papers read during the session, and summarised in the report, may be noted the presidential address, entitled "The Nebular Hypothesis," by Mr. W. E. Plummer; "Sun-spots and Terrestrial Magnetism," by Father Cortie, S.J. (a vice-president); and an account of a visit to the Yerkes Observatory by the Rev. R. Killip, secretary of the Society.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

A SCHOOL of electricity is to be established in connection with the Harris Institute, Preston. The cost will be defrayed out of a legacy of 2000l. left for the purpose of advancing mechanical and electrical engineering by the late Mr. J. Billington Booth, of Preston. Of the bequest, 1000l. will be devoted to the electrical engineering department, which will be under the superintendence of Mr. G. E. Gittins.

FROM the calendar for the session 1903–4 of the Bristol University College we learn that, excluding medical students, there were 285 day students during the session 1902–3, and 751 evening students. The subscriptions to the sustentation fund for the same year amounted to more than six hundred pounds; a special fund of 5500l. has been completed, and amongst other amounts from various persons and public bodies, the Bristol Town Council has contributed five hundred pounds for fifteen free studentships.

Science announces that Prof. J. Mark Baldwin, of Princeton University, has been called to a new chair in philosophy and psychology in the Johns Hopkins University, where it is proposed to organise a university department in these subjects. Dr. E. W. Scripture, assistant professor of experimental psychology at Yale University, has resigned and is succeeded by Dr. Charles H. Judd. Dr. Scripture is spending the year at Leipzig, where he is carrying on researches on the analysis of speech by means of gramophone records, under the auspices of the Carnegie Institution.

As is customary at this time of the year, we have recently received a number of prospectuses of technical institutions, and to some of them reference has already been made in these columns. The polytechnics of London appear to try, year by year, to make their courses of study more and more attractive to practical workmen as well as increasingly useful. The workshops in them are excellently equipped, and the practical demonstrations and lectures in connection therewith should prove of great benefit in supplying workmen with a knowledge of the scientific principles upon which their particular branches of technology are based. It is gratifying to observe a tendency towards specialisation on